Register Number: **6138**

Name of the Candidate:

B.E. DEGREE EXAMINATION, 2008

(CIVIL /CIVIL AND STRUCTURAL ENGINEERING)

(FOURTH SEMESTER)

CLEC-504/PCLEC-204/CSEC-505/PCSEC-304.SOIL MECHANICS

May) (Time: 3 Hours

Maximum: 60 Marks

(Common with part –Time civil Engineering, Second Semester and Structural engineering-Third Semester)

Answer any ONE FULL question from each unit
Assume any missing Data
All question carry equal marks

UNIT-I

1. A Natural Soil deposit has a bulk unit weight of 19KN/m^3 and water content of 6%.Calculate the amount of water required to be added to be added to 1$m^3$of soil to rise the water content to15%.Assume the voids ratio to remain constant. What will be the degree of Saturation? Assume G = 2.67. (12)

2. A Laboratory compaction test on a Soil having specific Gravity equal to 2.68 gave a maximum dry density of 1.82g/cm^3 and a water content of 17 percent .Determine the degree of Saturation, air Content and percentage air Voids at the maximum Dry Density. What would be the theoretical maximum dry density corresponding to zero voids at the Optimum Moisture content? (12)

UNIT-II

3. Define the term Permeability. What is the significance of permeability determination for Soils? Mention methods of determination of permeability of Soils. Explain any one method in detail. (12)

4. a) Determine the average coefficient of Permeability in the Horizontal and Vertical directions for a deposit of three layers of Thickness 5m, 1m and 2.5m and having the coefficient of permeability of 3×10^{-2} mm/Sec, 3×10^{-5} mm/Sec, 4×10^{-2} mm/Sec respectively. Assume the Layers are Isotropic. (8)

   b) Define Flow Net and Write its uses. (4)

UNIT-III

5. Find the intensity of Vertical Pressure and Horizontal Shear Stress at a Point 4 m directly below 25kN point load acting at a Horizontal Group Surface. What will be the vertical pressure and Shear Stress at a point 2.5m horizontally away from the axis of Loading but at the same depth of 3.5m?

6. A Saturated soil has a compression index of 0.25.Its void ratio at a Stress of 10KM/m^2 is 2.02Compute:

   i) Change in void ratio if the stress is increased to 19KN/m^2,
   ii) Settlement, if the soil stratum is 5m thick, and
   iii) Time required for 40% consolidation if drainage is one –way. (12)

UNIT-IV

7. Explain the principle of the Direct Shear Test. What are the advantages of their Test? What are its Limitations? (12)

8. The following are the results of undrained Triaxial Compression test on two identical Soil Specimens at Failure.

	I	II
Lateral Pressure (σ^3) kN/m^2	= 100	300
Total Vertical Pressure ($\sigma 1$) kN/m^2	= 440	760
Pore Water Pressure (μ) kN/m^2	= 20	60

   Determine the Cohesion and angles of Shearing Resistance
   a) Referred to Total Stress.
   b) Referred to Effective Stress.
   Use Mohr Circle Method. (12)

PTO

UNIT-V

9. What is Stability Number? What is its utility in analysis of Slopes? Discuss the uses of Stability Charts. (12)

10. Calculate the factor of Safety with respect to Cohesion of a Clay slope laid at 1 in 2 to a height of 10m, if angle of internal friction $\varphi = 10°$, C=25 kN/m^2 and $\gamma = 19kN/m^3$. What will be the critical height of the slope in this Soil? (12)

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